UC Santa Barbara
Respiratory Protection
Program Manual

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Table of Contents

I. Purpose/Introduction ........................................................................................................ 3

II. Applicability/Scope ........................................................................................................... 3

III. Responsibilities .................................................................................................................. 3
    A. Department Heads and Chairs .................................................................................... 3
    B. Supervisors .................................................................................................................. 3
    C. Employees .................................................................................................................... 4
    D. Occupational Health Physician or other Licensed Health Care Professional ............ 4
    E. Environmental, Health and Safety (EH&S) ................................................................. 4

IV. Definitions ........................................................................................................................ 4

V. Respirator Types - Use and Limitations ........................................................................... 6
    A. Air-Purifying Respirators (APRs) .............................................................................. 7
    B. Atmosphere Supplying Respirators (ASR) ................................................................. 8

VI. Requirements/Procedures .................................................................................................. 9
    A. Hazard Assessment and Control ............................................................................... 9
    B. Authorization for Use of Respiratory Protection Equipment ...................................... 10
    C. Respiratory Protection Equipment Selection .......................................................... 10
    D. Medical Evaluations ................................................................................................. 10
    E. Training ..................................................................................................................... 11
    F. Fit Testing ................................................................................................................. 11
    G. Equipment Maintenance ......................................................................................... 12
    H. Breathing Air Quality and Use ................................................................................. 12
    I. Voluntary Use ............................................................................................................. 13

VII. Record Keeping Requirements ....................................................................................... 13
    A. Training ..................................................................................................................... 13
    B. Medical Evaluations ............................................................................................... 13
    C. Fit Test Records ....................................................................................................... 14

VIII. References ..................................................................................................................... 14

IX. Issued By and Next Review Date .................................................................................... 14

X. Attachments ...................................................................................................................... 14
I. Purpose/Introduction

There are multiple state and federal regulations which govern the occupational use of respiratory protection equipment. The purpose of this document is to establish local written procedures in order to ensure compliance with these requirements. However, the primary purpose of the UCSB Respiratory Protection Program is to prevent and control occupational diseases which may be caused by exposure to hazardous atmospheres, through the following control measures:

1) The prevention of atmospheric contamination through the implementation of effective control measures wherever feasible.
2) When adequate control measures are not feasible, or while such measures are being implemented or evaluated, appropriate respiratory protection shall be provided to and worn by personnel who may be exposed to hazardous atmospheric conditions. The provision of respiratory protection to campus personnel shall meet the requirements set forth herein.

II. Applicability/Scope

The UCSB Respiratory Protection Program, through the requirements described in this manual, establishes procedures and responsibilities for UCSB students, faculty, staff and volunteers while engaged in University related activities. Per Cal/OSHA regulations and UCSB Campus Policy, all campus personnel who use respiratory protection equipment including filtering facepiece respirators (dust masks), shall be included in the UCSB Respiratory Protection Program and comply with the procedures contained herein.

III. Responsibilities

A. Department Heads and Chairs

Directors and Department Chairs are responsible for:

• Providing the necessary resources to ensure the health and safety of their employees;
• Identifying individuals as supervisors and ensuring they are trained on their health and safety responsibilities;
• Ensuring departmental compliance with campus health and safety policies and procedures;
• Ensuring hazards workplace hazards are identified and controlled.

B. Managers, Supervisors, and Principal Investigators

Managers, Supervisors, and Principal Investigators are responsible for:

• Ensuring their units understand and comply with the requirements of this program;
• Identifying employees who need to be enrolled in the Respiratory Protection Program and ensuring they are enrolled, and up to date on all program requirements;
• Requesting assistance from EH&S personnel to evaluate potential respiratory and other hazards as needed;
• Ensuring all use of respiratory protection equipment has been evaluated and approved by the Office of Environmental, Health and Safety (EH&S);
• Notifying EH&S of any changes relating to their employees’ health status, or the hazards for which their respirator will be used;
• Enforcing the use of respiratory protective equipment where required;
• Monitoring their employees for proper respirator use and care;
• Ensuring employees properly complete their Respirator/Cartridge Usage Logs and ensuring they obtain new cartridges before their current cartridges expire.
C. Employees, Students and Volunteers

Employees, Students and Volunteers are responsible for:

- Understanding and complying with campus health and safety policies and procedures;
- Notifying their supervisor or EH&S about any hazardous conditions observed on the worksite;
- Using respiratory protection equipment in accordance with instruction and training provided by EH&S personnel and their supervisor;
- Informing EH&S, their supervisor or the Occupational Health Physician of any personal health problems that could be aggravated by the use of respiratory equipment;
- Guarding their respirator against damage and ensuring it is not disassembled, modified, or otherwise altered in any way;
- Reporting any observed or suspected malfunctioning of respiratory protection equipment to EH&S personnel;
- Only using respiratory protection equipment for which they have been trained and fitted;
- Recording respirator use on their Respirator Usage Log after each use (Attachment I);
- Obtaining and replacing filters/cartridges in accordance with the UCSB Cartridge Change Schedule. (Attachment H)

D. Occupational Health Physician or other Licensed Health Care Professional

The Occupational Health Physician or other licensed health care professional (PLHCP) is responsible for:

- Conducting medical evaluations to determine the employee's ability to use a respirator;
- Informing EH&S and the employee of any restrictions regarding respirator use.

E. Environmental, Health and Safety (EH&S)

The UCSB Respiratory Protection Program is administered by EH&S. EH&S will function as a technical resource to departments and will assist them in carrying out their responsibilities as necessary. Specifically, EH&S is responsible for:

- Developing and maintaining the UCSB Respiratory Protection Program and ensuring it meets all applicable regulatory requirements;
- Conducting evaluations and recommending appropriate controls and/or respiratory protection equipment;
- Providing training, fit-testing and other technical assistance to campus personnel regarding respirator use;
- Providing guidance to and assisting respirator user with obtaining respirator medical clearances;
- Assessing the effectiveness of the program as described in this document.

IV. Definitions

**Air-purifying respirator** - A respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

**Assigned protection factor** (APF) means the workplace level of respiratory protection that a respirator or class of respirators is expected to provide to employees when the employer implements a continuing, effective respiratory protection program as specified by this section.
Atmosphere-supplying respirator - A respirator that supplies the user with breathing-quality air from a source independent of the work environment. This includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units.

Canister or cartridge - A container with a filter, sorbent media, catalyst, or combination of these items, that removes specific contaminants from the air.

Demand respirator - An atmosphere-supplying respirator that supplies breathing air to the user only when a negative pressure is created inside the facepiece by inhalation.

Emergency situation is any occurrence that may result in an uncontrolled significant release of an airborne contaminant. This may include equipment failure, rupture of containers, or failure of control equipment.

End-of-service-life indicator (ESLI) is a system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent media is approaching saturation or is no longer effective.

Escape-only respirator is a respirator intended to be used only for emergency exit from a contaminated area.

Filter or air purifying element is a component used in respirators to remove solid or liquid aerosols from the inspired air.

Filtering facepiece respirator (dust mask) is a negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.

Fit factor is a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

Fit test is the use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator. (See also Qualitative fit test QLFT and Quantitative fit test QNFT.)

High efficiency particulate air (HEPA) filter is a filter that is at least 99.97% efficient in removing monodisperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.

Immediately dangerous to life or health (IDLH) is an atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

Loose-fitting facepiece is a respiratory inlet covering that is designed to form a partial face-to-facepiece seal.

Maximum use concentration (MUC) means the maximum atmospheric concentration of a hazardous substance from which an employee can be expected to be protected when wearing a respirator, and is determined by the assigned protection factor of the respirator or class of respirators and the exposure limit of the hazardous substance. The MUC can be determined mathematically by multiplying the assigned protection factor specified for a respirator by the required OSHA permissible exposure limit, short-term exposure limit, or ceiling limit. When no
OSHA exposure limit is available for a hazardous substance, an employer must determine an MUC on the basis of relevant available information and informed professional judgment.

**Negative pressure respirator (tight-fitting)** is a respirator which uses a tight face-to-facepiece seal to create negative pressure inside the mask during inhalation with respect to the ambient air.

**Oxygen deficient atmosphere** is an atmosphere with oxygen content below 19.5% by volume.

**Physician or other licensed health care professional (PLHCP)** is an individual whose legally permitted scope or practice (i.e., license, registration, or certification) allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required by the regulations.

**Positive pressure respirator** is a respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

**Powered air-purifying respirator (PAPR)** is an air-purifying respirator that uses a built-in fan to actively filter ambient air through air-purifying elements to the inlet covering.

**Pressure demand respirator** is a positive pressure atmosphere-supplying respirator that supplies breathing air to the facepiece when the pressure inside the facepiece is reduced by inhalation.

**Qualitative fit test (QLFT)** is a pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

**Quantitative fit test (QNFT)** is an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

**Respiratory inlet covering** is that portion of a respirator that forms the protective barrier between the user's respiratory tract and an air-purifying device or breathing air source, or both. It may be a facepiece, helmet, hood, suit, or a mouthpiece respirator with nose clamp.

**Self-contained breathing apparatus (SCBA)** is an atmosphere-supplying respirator for which the breathing air source is contained within a portable compressed gas cylinder designed to be carried by the user.

**Service life** is the period of time that a respirator, filter or sorbent media, or other respiratory equipment provides adequate protection to the wearer.

**Supplied-air respirator (SAR) or airline respirator** is an atmosphere-supplying respirator for which the air supply is provided by an external, fixed compressed gas source or compressor. The SAR air supply is not typically carried by the user.

**Tight-fitting facepiece** is a respiratory inlet covering that forms a complete face-to-facepiece seal.

**User seal check** is an action conducted by the respirator user to determine if the respirator is properly seated to the face.

### V. Respirator Types - Use and Limitations

This section contains information about the various types of respiratory protection equipment commonly used at UCSB. It includes information on respirator use, limitations and maximum allowable protection factors. The maximum allowable protection factor is the maximum level of
respiratory protection that a class of respirators shall be used for at UCSB. UCSB personnel shall not enter Immediately Dangerous to Life or Health (IDLH) atmospheres at any time regardless of respirator type.

The ability of a respirator to protect a user depends on the respirator type, filter or canister type, contaminant type and concentration, environmental conditions and respirator fit. At UCSB, all respiratory protection equipment selection shall be performed by EH&S.

A. Air-Purifying Respirators (APRs)

Air-purifying respirators have filters, cartridges, and/or canisters that remove contaminants by passing the ambient air through the air-purifying element before it reaches the user. The maximum contaminant concentration against which an APR will protect is determined by the design efficiency, capability of the filter, and the facepiece-to-face seal on the user. Since APRs use filters and do not provide uncontaminated air separate from the surrounding atmosphere, it is crucial to know what contaminants are present and their relative concentrations. APRs do not protect users against oxygen-deficient atmospheres or chemical absorption through exposed skin, and shall not be used in unknown, oxygen deficient or IDLH atmospheres.

Negative Pressure APRs

Negative pressure APRs are tight-fitting respirators which use the negative pressure created inside the respirator facepiece when a user inhales, to draw ambient air through an air-purifying element in order to remove contaminants. It is important that negative pressure APRs be fit tested to ensure proper fit, because poor fit may allow contaminants to be drawn around the seal unfiltered and into the mask. Due to this feature users of tight-fitting negative pressure respirators shall not have any facial hair which interferes with the respirator-to-face seal. Additionally, negative pressure air-purifying respirators may cause pulmonary strain and/or discomfort to the user due to breathing resistance caused by the filtration media, therefore it is important that users are medically cleared and in good health. The three main types of negative pressure APRs used on campus are:

1. Filtering Facepiece Respirators (Dust Masks)

   UCSB Assigned Protection Factor: 5

   Use - Filtering facepiece respirators are typically designed to reduce inhalation exposure to low hazard particulate contaminants such as wood dust, animal dander, and some bioaerosols.

   Limitations – Because filtering facepiece respirators generally have poor respirator-to-face sealing properties they offer only limited contaminant protection. Additionally, their design makes it difficult for users to perform respirator seal checks to ensure proper fit prior to use. If respirator fit is not adequate, contaminant leakage around the respirator-to-face seal may occur. Filtering facepiece respirators do not provide protection against gases, vapors or oxygen deficient atmospheres, and shall not be used for protection against highly toxic contaminants.

2. Half-face Elastomeric APRs

   Cal/OSHA Assigned Protection Factor: 10

   Use - Half-face respirators are the most common type of respirator used at UCSB. EH&S has several brands available to help ensure a proper fit. Half-face respirators are typically equipped with High Efficiency Particulate Air (HEPA) filters, gas/vapor cartridges, or a combination of the two. It is very important that the proper filter or cartridge is selected for use based on the contaminant type.

   Limitations – Air-purifying respirators can only be used for certain contaminants based on the filter/cartridge type. Furthermore, cartridges must be replaced regularly as they may become
saturated over time. The wearer should leave an area immediately if he or she detects an odor, experiences nose or throat irritation, or if breathing becomes difficult.

3. **Full-face Elastomeric APRs**

   **Cal/OSHA Assigned Protection Factor: 50**

   **Use** - Full face-mask respirators typically provide more protection than half-masks because their shape allows a better respirator-to-face seal. They also protect the user’s eyes from irritating chemicals or particulate atmospheres.

   **Limitations** - Air-purifying full face-masks have the same limitations for use as half-mask respirators. Additionally, standard eyeglasses interfere with the mask-to-face seal; therefore, individuals who require corrective lenses may need to acquire special lenses for use with the mask. Contact the EH&S Industrial Hygiene Division for assistance with, or questions about, obtaining special lenses for respirator use.

**Positive Pressure APRs**

Positive pressure APRs are typically known as powered air-purifying respirators (PAPRs). PAPRs use a blower to create positive pressure inside the respirator face and can be either tight or loose fitting.

1. **Tight-fitting PAPRs**

   **Cal/OSHA Assigned Protection Factor: 50 Half-face/1,000 Full-face**

   **Uses** – This PAPR has an elastomeric facepiece made of rubber or silicone. It has filters and a blower that operate as they do on a loose-fitting facepiece PAPR. Because this PAPR has a tight-fitting facepiece, it must be fit tested.

   **Limitations** - Tight-fitting PAPRs have the same limitations as other air-purifying respirators. Additionally, they can be bulky and cumbersome due to the need for a motor and battery pack which is usually worn on the user’s belt.

2. **Loose-fitting PAPRs**

   **Cal/OSHA Assigned Protection Factor: 25 or 1,000 (Helmets/Hoods with manufacturer data supporting 1,000 APF only)**

   **Use** – This is a loose-fitting facepiece powered air-purifying respirator, or PAPR. Since it is loose-fitting, it does not need to be fit tested and can be used by workers with facial hair. Tight-fitting respirators may cause issues for people with facial hair, glasses or facial prosthetics. These problems can be greatly reduced or eliminated through the use of a PAPR. PAPRs use a blower to force ambient air through the air-purifying elements and into the user’s facepiece creating a positive pressure in the facemask or loose fitting hood.

   **Limitations** - They can be bulky and cumbersome due to the need for a motor and battery pack which is usually worn on the user’s belt.

**B. Atmosphere Supplying Respirators (ASR)**

Atmosphere-supplying respirators supply users with breathing air from a source independent of the work environment. The maximum contaminant concentration against which an atmosphere supplying respirator will protect is determined by the face piece type and design. When using these devices it is important to ensure that the location of the air tank is not near a source of carbon monoxide or other contaminants, and that Grade D air is supplied as described by the compressed gas association. Departments wanting to utilize ASR units must notify EH&S prior to use and are
responsible for ensuring all requirements of use are met. The two most common types of ASRs are:

1. **Airline Atmosphere Supplying Respirators**  
   **Cal/OSHA Assigned Protection Factor: Varies by facepiece type**  
   **Use** - Supplied-air respirator (SAR) or airline respirator is an atmosphere-supplying respirator for which supply air is provided by an external, fixed compressed gas source or compressor.  
   **Limitations** - The wearer's movements are restricted by the hose and they must return to a respirable atmosphere by retracing their route of entry. In addition, supply hoses may become severed or pinched, or the external compressed gas source may fail.

2. **Self-Contained Breathing Apparatus (SCBA)**  
   **Cal/OSHA Assigned Protection Factor: Varies by facepiece type**  
   **Use** - Self-contained breathing apparatus (SCBA) is an atmosphere-supplying respirator for which the breathing air source is contained within a portable compressed gas cylinder designed to be carried by the user.  
   **Limitations** - The air supply in a SCBA cylinder is normally rated for a specified limited time; however, heavy exertion and stress will increase breathing rates and may deplete the air in less than the rated time. For this reason most units come with built-in alarms which alert the user when the air supply is low. Additional limitations are their weight and bulk, their limited service-life, and the need for specialized training for their maintenance and safe use.

VI. **Requirements/Procedures**

A. **Hazard Assessment and Control**

Departments and their supervisors have the primary responsibility for ensuring workplace hazards are identified and controlled. Specifically, supervisors are responsible for ensuring documented Job Hazard Assessments (JHAs) are conducted for all jobs and job tasks prior to their commencement. Job Hazard Assessments should encompass the entire process and identify both real and potential hazards. Workplace hazards should be eliminated or reduced whenever possible. When workplace hazards cannot be completely eliminated, or controlled below acceptable exposure limits, engineering controls shall be implemented to eliminate or reduce the risk of exposure for employees. The best time to introduce engineering controls is when a facility or process is in the design phase. An example of engineering controls would be the use of ventilation to capture and remove contaminants before they enter a worker's breathing zone. When engineering controls are not feasible, or have yet to be installed, administrative controls may be used to keep exposures below applicable regulatory limits. Examples of administrative controls are work period reduction, job rotation, appropriate work practices, proper maintenance, and personal hygiene.

Personal Protective Equipment (PPE) such as respirators are the last line of defense against workplace hazards and should only be considered after it has been determined that engineering and administrative controls are not feasible, have yet to be implemented, or if they are not sufficient to achieve acceptable levels of exposure. If it is determined that respiratory protection equipment is required to keep personnel exposure below regulatory limits, those individuals shall be enrolled in the UCSB Respiratory Protection Program.
To assist supervisors with the Hazard Assessment process, EH&S has created the UCSB Job Hazard Assessment & PPE Selection Tool (Attachment G). Additionally, EH&S will provide supervisors with Job Hazard Assessment assistance and training upon request.

B. Authorization for Use of Respiratory Protection Equipment

Per the UCSB Respiratory Protection Policy (P-5440), the purchase and use of all respiratory protection equipment by campus personnel shall be reviewed and approved by EH&S. If it is determined that respiratory protection equipment is required to reduce exposures below applicable exposure limits, those individuals who are required to use respiratory protection equipment shall be enrolled in the UCSB Respiratory Protection Program.

In order to remain enrolled in the UCSB Respiratory Protection Program individuals must be up to date on all training, medical evaluation and fit testing requirements. EH&S will notify respiratory users and their supervisors approximately one (1) month before the user becomes due for training, fit testing or a medical evaluation. When an individual is three (3) or more months overdue for one or more of the enrollment requirements, EH&S will notify the respirator user and their supervisor that the user has been unenrolled from the program, and that they shall no longer use their respirator or perform work activities that requires its use.

Supervisors have the primary responsibility for ensuring their users continue to comply with program requirements and are using respiratory protection equipment properly. EH&S will also monitor for proper use during audits and inspections.

C. Respiratory Protection Equipment Selection

EH&S personnel will make the final determination on the type of respiratory protection equipment required for each user through the use of the following methods:

- Reviewing information provided by, or obtained through Job Hazard Assessments (JHAs)
- Evaluating Safety Data Sheets and/or other information related to the respiratory hazards
- Consultation with the supervisor and/or employee
- Observation of operations and work practices
- Evaluating existing or alternative engineering controls
- Evaluating exposure monitoring data

Selection choices for new operations shall be added to the Respiratory Protection Equipment Selection Chart and Cartridge Change Schedule. Only NIOSH-certified respirators shall be used.

D. Medical Evaluations

Prior to fit testing or use, all individuals required to wear respiratory protection equipment shall successfully complete a medical evaluation performed by a physician or other licensed health care professional (PLHCP) to determine the employee's ability to use such equipment. The PLHCP is responsible for conducting medical evaluations using the Health Status Questionnaire and any follow-up medical examinations, tests, consultations, or diagnostic procedures that the PLHCP deems necessary (any cost will be recharged to the appropriate department recharge number). The Health Status Questionnaire and examinations will be administered confidentially during the employee's normal working hours.

At UCSB Medical Evaluations are conducted using the 3M Online Respirator Medical Evaluation service or by Sansum Occupational Health Clinic. Individuals who are required to complete a Respirator Medical Evaluation will be instructed on how to do so by EH&S.

The following information must be provided to the PLHCP before the PLHCP makes a recommendation concerning an employee's ability to use a respirator:
a. The type and weight of the respirator to be used by the employee;
b. The duration and frequency of respirator use (including use for rescue and escape);
c. The expected physical work effort;
d. Additional protective clothing and equipment to be worn; and
e. Temperature and humidity extremes that may be encountered.

The PLHCP shall provide the employee and EH&S with a written recommendation regarding the employee’s ability to use. The recommendation shall provide only the following information:

a. Any limitations on respirator use related to the medical condition of the employee, or relating to the workplace conditions in which the respirator will be used, including whether or not the employee is medically able to use the respirator;
b. The need, if any, for follow-up medical evaluations;

Respirator users shall stop using respiratory protection equipment and be reevaluated immediately if any of the following occur:

a. They report adverse medical signs or symptoms that are related to ability to use a respirator;
b. A PLHCP, supervisor, or the respirator program administrator informs the employer that an employee needs to be reevaluated;
c. Information from the respiratory protection program, including observations made during fit testing and program evaluation, indicates a need for employee reevaluation; or
d. A change occurs in workplace conditions (e.g., physical work effort, protective clothing, temperature) that may result in a substantial increase in the physiological burden placed on an employee.

E. Training

All individuals required to wear respiratory protection shall complete EH&S Respiratory Protection Training prior to respirator use and at least annually thereafter. Individuals shall be retrained immediately if they exhibit signs that it is necessary, such as improper respirator use. Topics covered by the training shall include:

- Supervisor and employee responsibilities under the UCSB Respiratory Protection Program
- Why their respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator;
- Proper respirator selection and cartridge type;
- The limitations and capabilities of their respirator;
- How to use their respirator effectively in emergency situations, including situations in which the respirator malfunctions;
- How to inspect, don, doff, use, and check the seals of their respirator;
- Procedures for maintenance and storage of their respirator;
- How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators; and
- The requirements of the Cal/OSHA Respiratory Protection Standard.

F. Fit Testing

All campus personnel required to utilize respiratory protection equipment must be qualitatively or quantitatively fit tested using the UCSB Respirator Fit Test Protocol (Attachment C) prior to use of respiratory protection equipment and at least annually thereafter. Fit testing shall be stopped and recorded as a fail under any of the following conditions:
a. Hair interferes with the fit or operation of half or full face mask if it extends under the facepiece sealing area. If this condition exists, no attempt will be made to fit such personnel under any circumstances.

b. An employee exhibits difficulty in breathing during the test. If this happens the employee shall be referred back to the PLHCP to determine whether the employee can wear a respirator while performing his or her duties.

c. If for any reason an individual is unable to obtain a satisfactory facepiece seal when presented with a variety of sizes and models of respirators, that individual shall not be assigned to nor allowed to engage in a task requiring suitable respiratory protection equipment.

Additionally, fit testing shall be repeated if the user experiences one or more of the following after their last fit test:

a. Signs or symptoms of contaminant breakthrough.

b. A weight change of 20 pounds or more.

c. Significant facial scarring in the area of the facepiece seal.

d. Significant dental changes, i.e., multiple extractions without prosthesis, or dentures.

e. Reconstructive or cosmetic surgery.

f. Any other condition that may interfere with facepiece sealing.

G. Equipment Maintenance

Respirator users have the primary responsibility for cleaning and maintaining their personal respiratory protection equipment. Local protocols and procedures shall be established and maintained for shared and emergency equipment. Supervisors shall monitor their employees for proper equipment care as needed, and EH&S will perform inspections of equipment during fit testing. Damaged or altered respiratory protection equipment shall not be used. Respirator users are responsible for the following:

a. Inspecting valves, head straps and other parts of equipment before each use.

b. Cleaning and disinfecting equipment after each use or as needed.

c. Storing equipment in the proper location away from heat, light and moisture.

d. Replacing filters/cartridges in accordance with the UCSB Cartridge Change Schedule.

e. Notifying their supervisor or EH&S if equipment becomes damaged or defective.

H. Breathing Air Quality and Use

Breathing air couplings shall be incompatible with outlets for nonrespirable worksite air or other gas systems. No asphyxiating substance shall be introduced into breathing air lines. Only breathing gas containers marked in accordance with the NIOSH respirator certification standard, 42 CFR part 84 shall be used. Additionally, local protocols and procedures shall be established and maintained to ensure compressed air, compressed oxygen, liquid air, and liquid oxygen used for respiration meets the following specifications:

a. Compressed and liquid oxygen shall meet the United States Pharmacopoeia requirements for medical or breathing oxygen; and

b. Compressed breathing air shall meet at least the requirements for Grade D breathing air described in ANSI/Compressed Gas Association Commodity Specification for Air, G-7.1-1989, to include:

i. Oxygen content (v/v) of 19.5-23.5%;

ii. Hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less;

iii. Carbon monoxide (CO) content of 10 ppm or less;

iv. Carbon dioxide content of 1,000 ppm or less; and
v. Lack of noticeable odor.

Cylinders used to supply breathing air to respirators shall meet the following requirements:

- a. Cylinders are tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR part 180);
- b. Cylinders of purchased breathing air have a certificate of analysis from the supplier that the breathing air meets the requirements for Grade D breathing air; and
- c. The moisture content in the cylinder does not exceed a dew point of -50 deg. F (-45.6 deg. C) at 1 atmosphere pressure.
- d. Only the respirator manufacturer’s NIOSH approved breathing-gas containers, marked and maintained in accordance with the Quality Assurance provisions of the NIOSH approval for the SCBA as issued in accordance with the NIOSH respirator-certification standard at 42 CFR part 84 shall be used.

For compressors that are not oil-lubricated, carbon monoxide levels in the breathing air shall not exceed 10 ppm. For oil lubricated compressors, high-temperature or carbon monoxide alarm, or both, shall be used to monitor carbon monoxide levels. If only high-temperature alarms are used, the air supply shall be monitored at intervals sufficient to prevent carbon monoxide in the breathing air from exceeding 10 ppm. Additionally, compressors used to supply breathing air to respirators shall be constructed and situated so as to:

- a. Prevent entry of contaminated air into the air-supply system;
- b. Minimize moisture content so that the dew point at 1 atmosphere pressure is 10 degrees F (-5.56 deg. C) below the ambient temperature;
- c. Have suitable in-line air-purifying sorbent beds and filters to further ensure breathing air quality. Sorbent beds and filters shall be maintained and replaced or refurbished periodically following the manufacturer's instructions.
- d. Have a tag containing the most recent change date and the signature of the person authorized by the employer to perform the change. The tag shall be maintained at the compressor.

I. Voluntary Use

Campus personnel who are not required to use respiratory protection, but would like to do so voluntarily must first receive approval by EH&S. If voluntary use is approved, they shall meet all respirator use requirements and be enrolled into the UCSB Respiratory Protection Program.

Exception: Personnel whose only use of respirators involves the voluntary use of filtering facepiece respirators are not required to be enrolled in the UCSB Respiratory Protection Program. Instead they must read and sign the UCSB Filtering Facepiece Respirator Voluntary Use Form (Attachment F).

VII. Record Keeping Requirements

A. Training

Departments shall retain training records for at least ten years after the person has retired or left University employment. Training completed/recorded on the Learning Management System (LMS) is kept indefinitely.

B. Medical Evaluations

Records of medical evaluations required by this section must be retained in accordance with section 3204.
C. Fit Test Records

Fit tests shall be kept for as long as an individual is enrolled in the UCSB Respirator Protection Program.

VIII. References

Cal/OSHA Respiratory Protection Standard (CCR, Title 8, Section 5144)

IX. Issued By and Next Review Date

Issued by: Jesse Bickley, Industrial Hygiene Program Manager
Date: October 2016
Next Review Date: Annually

X. Attachments

Attachment A: UCSB Respiratory Protection Policy P-5440
Attachment B: UCSB New Enrollee and Annual Refresher Protocol
Attachment C: UCSB Respirator Fit Test Protocol
Attachment D: Instructions for Enrolling in the UCSB Respiratory Protection Program
Attachment E: UCSB Annual Respirator Refresher Form
Attachment F: UCSB Filtering Facepiece Respirator Voluntary Use Form
Attachment G: UCSB Job Hazard Assessment & PPE Selection and Training Tool
Attachment H: UCSB Respiratory Protection Equipment Selection Chart and Cartridge Change Schedule
Attachment I: UCSB Respirator Usage Log
Attachment J: UCSB Respirators and Cartridge Weight Chart
Attachment A

UCSB Respiratory Protection Policy P-5440

UC Santa Barbara Policies Policy 5440
Issuing Unit: Administrative Services Date: May 1, 1987

RESPIRATORY PROTECTION

I. REFERENCES:
   A. Title 8, California Administrative Code, General Industry Safety Order 5144.

II. POLICY:
   It is the policy of the University of California, Santa Barbara, to maintain an environment, insofar as it is reasonably within the control of the University to do so, that will not adversely affect the health, safety and well-being of students, employees, visitors and neighboring human populations.

   A. Because of the potential hazards associated with exposure to hazardous substances and atmospheres, a Respiratory Protection Program has been designed which defines necessary respiratory protection equipment and safe procedures for its use.

   B. All activities involving the use of respiratory protection equipment, in facilities controlled by the University of California, Santa Barbara, shall be conducted in compliance with Title 8 of the California Administrative Code, General Industry Safety Order 5144, and with the provisions of the UCSB Respiratory Protection Manual.

   C. The Respiratory Protection Manual establishes the procedures and requirements necessary to meet various enforcing agencies' regulations for use of respiratory protection equipment and to provide the necessary health and safety protection to those persons falling within the jurisdiction of the program.

   D. Department chairpersons, unit managers, and/or principal investigators and line supervisors are responsible and accountable for assuring employee compliance with the respiratory protection program stipulations. The Environmental Health and Safety Office will provide technical assistance to departments in their administration of this program.

   E. The Office of Environmental Health and Safety will act as the sole source for purchasing, cleaning, maintaining, fitting and approving the use of all respiratory equipment and for training Santa Barbara Campus personnel in its use.
UCSB New Enrollee and Annual Refresher Protocol

A. New Enrollee Checklist

1. Obtain the following information for the prospective user:
   a. Full name.
   b. Supervisor and department name.
   c. A valid Recharge Number (8-____-____-____-____-____-) for medical evaluation (currently $28 if necessary) and any respiratory protection equipment issued by EH&S.
   d. Name and Safety Data Sheets (SDSs) for the hazardous substance(s) which it is believed will necessitate the use of respiratory protection.
   e. Summary of the operation(s) to be performed while using the respirator.
   f. Estimated frequency and duration of respirator use.
   g. If humidity and/or temperature extremes will be encountered while wearing the respirator.
   h. Additional Personal Protective Equipment (PPE) to be required during respirator use if applicable.

2. Perform a documented Industrial Hygiene Exposure Assessment if one has not already been conducted for the job/process. File the completed IH Exposure Assessment Form on the DFS along with supporting documents (SDSs, emails, etc.) and update the Cartridge Selection/Change Chart if necessary.

3. Provide new user with a log-in ID for the 3M Respirator Evaluation website:
   - If medical evaluation is failed, person should receive information in the mail from 3M. Sansum is available as an alternative method for medical evaluation.
   - If applicable, verify that new user has completed Hazard Communication/GHS training. If they have not, send them information on how to complete.

4. When contacted for training and fit-test appointment:
   - Do not make an appointment until the medical evaluation has been completed.
   - Verify that they have completed Hazard Communication Training, if applicable. If not, ensure it is completed prior to respirator fit-testing.
   - Remind the user to be clean shaved if male.

5. Training and Quiz:
   - Deliver New User training and quiz.
   - Review quiz with new user.
   - Have them review the “Important Things to Remember When Using Air Purifying Respirators (APR’s)” sheet.
   - **Emphasize that they can only use their respirator/cartridges against certain air contaminants** (ex. if they are using a respirator with particulate filters, inform them that they must not use it for gases/vapors).

6. Conduct Fit-Test

B. Refresher Checklist

1. Send user an email that they are due for training, fit-testing or medical approximately one month prior to due date and CC their supervisor. Include Annual Refresher Form (Form C), and/or 3M Respirator Evaluation ID if user is due for a medical evaluation. Keep records of all notification emails. Verify that they have completed Hazard Communication Training, if applicable. If not, ensure it is completed prior to respirator fit-testing.
2. If necessary, send user a second email to user and supervisor around their due date reminding them that the user will be unenrolled and unable to use their respirator if they do not complete the required steps within 90 days.

3. Send enrollment email to user and supervisor when user is 90 days overdue for respirator training, fit-testing or medical evaluation.

4. Ensure they bring completed Annual Refresher Form (Form C) fit test appointment. If they do not, have them complete a copy onsite.

5. Consult employee on the following items to ensure program effectiveness and to identify any problems:
   a) Respirator fit (including the ability to use the respirator without interfering with effective workplace performance);
   b) Appropriate respirator selection for the hazards to which the employee is exposed;
   c) Proper respirator use under the workplace conditions the employee encounters; and proper respirator maintenance.

6. Verify that user has brought all respiratory protection equipment issued in for fit-testing. If not, send email to user and supervisor specifying which equipment user is authorized to use.

7. Conduct training and fit-testing.
Attachment C

Respirator Fit-Test Protocols

A. Quantitative Fit-Test Protocol

1. Fit Test Equipment Set-Up

   Computer (Dell laptop)
   1. Turn on the computer.
   2. Enter user ID and password.
   3. Open the Fitplus software on desktop.
   4. The software will ask you if you want to perform Daily Checks - click “No” (We do this manually each day before running any tests because there is a slight discrepancy between the actual reading and the computer reading).

   Porta Count
   1. Insert alcohol cartridge into Porta Count.
   2. Turn on PortaCount.
   3. Perform particle count by initiating count mode with no attachments to hose:
      a. Particle concentration should be 3,000-50,000 range, 1K is minimum
      b. Troubleshoot if not in range
   4. Perform zero check by attaching filter to clear tube:
      a. First observe particle concentration, it should be ~0
      b. Troubleshoot if not in range
   5. Next perform Max FF check by pressing fit test mode button, then start:
      a. Allow PortaCount to go through 1 cycle at least. A fit factor of at least 50K should be displayed, troubleshoot if not in range

2. Respirator and Cartridge Verification/Selection

   1. Consult Respirator Usage Approval Form (Form A) or Equipment Selection Guide for required respirator(s) and cartridge(s).
   2. Obtain and review respirator usage log.
   3. Ask the user what they will be using their respirator for to verify the information on the sheet is accurate.
   4. If they haven’t already been issued a respirator or need a new respirator select new respirator brand and size. For half-face respirators try 3M brand respirator first. Medium is always a good size to start with unless it is apparent the individual will require a large or small.
   5. Show employee how to don respirator and adjust fit. Once adjusted properly, ask them to perform positive and negative pressure fit checks. If the mask leaks or if the fit is uncomfortable try adjusting the respirator or select a different brand or size of respirator.
   6. Look up the cartridge type necessary for the user by referring to the Respiratory Protection Equipment Selection Chart and Cartridge Change Schedule. Typically two sets of cartridges are issued. However, ask them how often they will use their respirator and/or how many cartridges they think they need.
   7. Ask user if they need any additional equipment such as cover lens for full face respirators or pre-filters for cartridges.
   8. Consult with CIH if there are any discrepancies or if you have any questions.
3. Conducting the Fit-test

Step 1 – Positive/Negative Pressure Fit Checks
1. Prior to installing fit-test adaptor and probe ask the user to don respirator and conduct positive and negative pressure fit-checks if they haven’t done so already.
2. If leakage occurs ask the user to inspect respirator (provide assistance if necessary), fix any deficiencies and ask them to retry pressure checks.
3. If the mask fails again select new respirator.

Step 2 – Install Fit-Test Adaptor and Probe
1. Properly install fit-test adaptor and probe. Make sure the probe tube is not crimped and the cartridges and adapter are not cross-threaded.

Step 3 – Enter/update user information
1. Click on “Fit Test” icon
2. If the user is already in the database, use the sorted list to find the individual. Verify their information and update as necessary, click “Next”
3. If the person is not in the database, click “New” and enter the required information:
   i. For “company” enter the department where the person works
   ii. For “location” enter “UCSB”
   iii. For cust 1, enter the supervisor’s name
   iv. For cust 2, enter the due date of the next physical
4. After entering this information, click “Next”
5. Using the Respirator list, select a respirator and click “Next”
6. The correct protocol should already be selected (TB 29CFR1910.139) Click “Next” (The fit factors should be 100 and 500 for half-mask and full-face respirators respectively.)
7. Enter the mask size and your name in the fit-test administrator field and click “Next”

Step 4 - Conduct Fit-Test
1. Explain to user how the test will be performed. Make sure they understand what to do during each test and explain to them what the numbers/results mean and how the PortaCount works.
2. Click start to begin the Fit Test.
3. Make sure users follow the fit-test directions.
4. If fit test is failed make necessary adjustments and redo test.

Step 5 - Additional Items and Recordkeeping
1. If person is a new user have them read the “Important Things to Remember When Using Air Purifying Respirators (APR’s)” sheet.
2. When fit test is passed print report and have user sign.
3. Fill-out fit-test certification card and give to user.
4. Provide user with a Respirator/Cartridge Usage Log and explain how to use it.
5. Each user should have a bag for their respirator, one or more sets of new cartridges and lens covers, cleaning wipes, etc. as needed.
6. Attach users completed Form A/C, usage log, quiz and fit-test report (in that order top to bottom) add to existing file if applicable.
7. File packet by last name in filing cabinet.
4. Recharges
   1. Fill out a respirator recharge form with the proper information from their Form A/C during or after the user’s fit test. The Recharge form can be accessed using the “Shortcut to RPP Recharge Forms” located on the Desktop.
   2. To fill out the form, enter the User’s information including their name, supervisor, department, recharge number and include the date of the fit test. NOTE: For EH&S individuals, the recharge number does not need to be completed.
   3. Next, fill out the quantity of equipment recharged on their designated lines and the cost will auto complete (leave the Sansum section blank).
   4. If the user does not need equipment, fill out the top portion and leave the equipment portion blank, also under notes write, “Fit Test Only”
   5. If a user comes in for new respiratory protection equipment and they have not had a recent medical evaluation, fill out the recharge form and under notes write, “Equipment Only”
   6. Place completed for into Gayle’s box for processing.

5. Equipment Shutdown and Clean-up
   1. Exit Fitplus software and turn off PortaCount.
   2. Remove alcohol cartridge and place in its container. Make sure alcohol level is properly filled up to line.
   3. Shut down computer.
   4. Put all extra plastic bags in drawer F7.

B. Qualitative Fit-Test Protocol for Filtering Facepiece Respirators

1. Fit Test Equipment Set-Up
   1. Retrieve QLFT box from the glass cabinet, remove components, and attach fit test hood to collar by placing drawstring between flanges on collar. Tighten drawstring and tie with square knot or bow.
   2. Pour a small amount (~ one teaspoonful) of the sensitivity test solution (#1) into the nebulizer labeled #1 sensitivity test solution.
   3. Pour the same amount of fit test solution (#2) into the second nebulizer labeled #2 fit test solution.

2. Sensitivity Test
   This test is done to assure that the person being fit tested can detect the taste of the test solution at very low levels. The Sensitivity Test Solution is a very dilute version of the Fit Test Solution. The test subject should not eat, drink (except water), or chew gum for 15 minutes before the test.
   1. Have the test subject put on the hood and collar assembly without a respirator.
   2. Position the hood assembly forward so that there is about six inches between the subject’s face and the hood window.
   3. Instruct the test subject to breathe through his/her mouth with tongue extended.
   4. Using Nebulizer #1 with the Sensitivity Test Solution (#1), inject the aerosol into the hood through the hole in the hood window. Inject ten squeezes of the bulb, fully collapsing and allowing the bulb to expand fully on each squeeze. Both plugs on the nebulizer must be removed from the openings during use. The nebulizer must be held in an upright position to ensure aerosol generation.
   5. Ask the test subject if he/she can detect the taste of the solution. If tasted, note the number of squeezes as 10 and proceed to the Fit Test.
6. If not tasted, inject an additional ten squeezes of the aerosol into the hood. Repeat with ten more
    squeezes if necessary. Note whether 20 or 30 squeezes produced a taste response.
7. If 30 squeezes are inadequate, in that the subject does not detect the taste, the test is ended.
    Another type of fit test must be used.
8. Remove the test hood, and give the subject a few minutes to clear the taste from his/her mouth. It
    may be helpful to have the subject rinse his/her mouth with water.

3. Conducting the Fit-test

1. Have the test subject don the respirator and perform a user seal check per the instructions provided
    on the respirator package.
2. Have subject wear any applicable safety equipment that may be worn during actual respirator use
    that could interfere with respirator fit. Respirator must be worn at least 5 minutes before testing.
3. Have the subject put on and position the test hood as before, and breathe through his/her mouth
    with tongue extended.
4. Using Nebulizer #2 with Fit Test Solution (#2), inject the fit test aerosol using the same number of
    squeezes as required in the Sensitivity Test (10, 20, or 30). A minimum of ten squeezes is
    required, fully collapsing and allowing the bulb to expand fully on each squeeze. The nebulizer
    must be held in an upright position to ensure aerosol generation.
5. To maintain an adequate concentration of aerosol during this test, inject one-half the number of
    squeezes (5, 10, or 15) every 30 seconds for the duration of the fit test procedure.
6. After the initial injection of aerosol, ask the test subject to perform the following test exercises for
    60 seconds each: Normal breathing, deep breathing, left/right, up/down, talking, bend-over,
    normal breathing.
7. The test is terminated at any time the taste of aerosol is detected by the subject because this
    indicates an inadequate fit. Wait 15 minutes and perform the fit test again.
8. Repeat the fit test after redonning and readjusting the respirator. A second failure may indicate
    that a different size or model respirator is needed.
9. If the entire test is completed without the subject detecting the aerosol, the test is successful and
    respirator fit has been demonstrated.
10. Periodically check the nebulizer to make sure that it is not clogged. If clogging is found, clean
    the nebulizer and retest.

4. Recordkeeping

1. Retrieve Qualitative Fit-Test Reports from drawer B11
2. Have user sign and date on form
3. Fill in Respirator data
4. Sign and date
5. Fill-out fit-test certification card and give to user.
6. If individual is a new user from the Psychology department inform IACUC Coordinator that
    individual has been enrolled in the Respiratory Protection Program
7. Add individuals next fit-test due date to the Qualitative Fit-test database.
8. Attach users completed Form A/C, quiz and fit-test report (in that order top to bottom) add to
    existing file if applicable.

5. Recharges

1. Fill out a respirator recharge form with the proper information from their Form A/C during or
    after the user’s fit test. The Recharge form can be accessed using the “Shortcut to RPP
    Recharge Forms” located on the Desktop.
2. To fill out the form, enter the User’s information including their name, supervisor, department, recharge number and include the date of the fit test. NOTE: For EH&S individuals, the recharge number does not need to be completed.
3. Next, fill out the quantity of equipment recharged on their designated lines and the cost will auto complete (leave the Sansum section blank).
4. If the user does not need equipment, fill out the top portion and leave the equipment portion blank, also under notes write, “Fit Test Only”
5. If a user comes in for new respiratory protection equipment and they have not had a recent medical evaluation, fill out the recharge form and under notes write, “Equipment Only”
6. Place completed form into Gayle’s box for processing.

6. Equipment Clean-up
   1. Immediately after completing the test, discard the unused solutions. DO NOT pour unused solutions back into bottles. Rinse the nebulizers with warm water to prevent clogging. Wipe out the inside of the hood with a paper towel to remove any deposited test solution.
Directions for Enrolling in the UCSB Respiratory Protection Program

Per the UCSB Respiratory Protection Policy (P-5440), the Office of Environmental, Health and Safety (EH&S) must issue, and approve the use of all respiratory protection equipment used by campus personnel. Furthermore, all individuals required to use respiratory protection equipment to reduce exposure below applicable exposure limits, shall be enrolled UCSB Respiratory Protection Program (RPP). In order to be enrolled in the RPP individuals must complete the training, medical evaluation and fit testing requirements outlined below. Please contact the RPP using the contact information at the bottom of the page if you have any questions.

Step 1:  
Per Cal/OSHA regulations, a documented Job Hazard Assessment (JHA) must be conducted for all job tasks using hazardous substances or requiring the use of Personal Protective Equipment (PPE). The hazard assessment should encompass the entire process and identify both real and potential hazards. The assessment should focus on eliminating or reducing hazards through the use of product substitution, and engineering and administrative controls. To assist supervisors with this task EH&S has created the UCSB Job Hazard Assessment & PPE Selection Tool available here:  
http://www.ehs.ucsb.edu/files/docs/ih/UCSB_Hazard_and_PPE_Assessment_Tool.pdf  
EH&S can provide JHA assistance and training as upon request. Additional information on completing a JHA can be found here:  
http://www.osha.gov/Publications/osha3071.pdf

Step 2:  
Email the RPP (RPP@ehs.ucsb.edu) with the following information regarding the prospective respirator user:

a. Completed Hazard Assessment including name and Safety Data Sheets (SDSs) for the hazardous substance(s) which it is believed will necessitate the use of respiratory protection.
b. Employee’s full name.
c. Supervisor and department name.
d. A valid Recharge Number (8-__-__-__-__-__-__-) for medical evaluation (currently $28 if necessary) and any respiratory protection equipment issued by EH&S.
e. Summary of the operation(s) to be performed while using the respirator.
f. Estimated frequency and duration of respirator use.
g. If humidity and/or temperature extremes will be encountered while wearing the respirator.
h. Additional Personal Protective Equipment (PPE) to be required during respirator use if applicable.

This information will be used to determine if respiratory protection is required, and if so, which type. If additional information is required you will be notified. If not, a login ID number for the online respirator medical evaluation will be provided.

Step 3:  
Once you have a login ID number, go to www.respexam.com and click on the link for employees. Enter your login ID and complete the medical questionnaire. Please contact the RPP or 3M at 1-800-383-3393 if you have any questions regarding the medical evaluation process.

Step 4:  
If you are cleared for respirator use, proceed to Step 4. If you are not cleared for use, contact the RPP for further directions.

Step 5:  
Review and familiarize yourself with UCSB’s Respiratory Protection Manual which can be accessed online at:  

Step 6:  
All individuals working with hazardous substances outside of a laboratory must be included in the UCSB Hazard Communication Program (HCP). HCP requirements include training, an inventory of hazardous substances, proper labeling and readily available SDS sheets. Below are instructions on how to complete documented Hazard Communication training online through the UCSB Learning Management System (LMS). Additional HPC information and requirements can be found here:  
http://www.ehs.ucsb.edu/ih/hazard-communication-program
a. Using a compatible internet browser (see link below for updated list) enter
https://www.learningcenter.ucsb.edu/ in the Address box and press Enter.

Important Note: Browsers must be set to allow/enable cookies (small text files that store messages). It is also recommended that you disable pop-up blockers, which can affect the function of the Learning Center application. Upon first login to the Learning Center, the program may detect the existence of pop-up blockers and remind you to disable them. For more information about Learning Center computer requirements and compatible browsers go to: https://www.learningcenter.ucsb.edu/faq/learning-center-computer-requirements

b. Follow the instruction for logging into the Learning Center. For UCSB employees your UCSBnetID is your online identity for accessing the UCSB Directory, Corporate Time, Kronos, and other UCSB online systems and services.

c. To find the Hazard Communication course, search for: Hazard Communication
d. Click on the little arrow to the left of the training you would like to complete, click on the title of the eCourse, then click on the register button.
e. Check the box at the bottom of the window and click "Submit."
f. Click "Start" and follow the prompts to complete the training.

Additional Hazard Communication Program requirements can be found

Step 7: Make an appointment for respirator fit testing by emailing the RPP at RPP@ehs.ucsb.edu or call 893-3743, you will be issued your respirator at this time. There may be no facial hair between the respirator’s seal and the users face. Men must be clean shaven at the time of fit testing and whenever they use their respirator. Per OSHA regulations, fit testing will not be conducted for employees with interfering facial hair. Fit-testing typically takes less than 30 minutes but on rare occasions it may take longer.

If you have any questions regarding these directions please email the Respiratory Protection Program at RPP@ehs.ucsb.edu or call 893-3743 or 893-8787.
Attachment E

UCSB Annual Respirator Refresher Form

Based upon my understanding of the Campus Respiratory Protection Manual and Cal-OSHA regulations, the following employee will require the use of respiratory protection equipment while performing their job duties:

Employee Name: _____________________________ Employee Number: ____________
Employee Email: ______________________________ Phone: ______________
Supervisor/Dept. Head Name (please print): __________________________
Supervisor Signature: __________________________ Date: ______________
Department: __________________________ Extension: ______________

Valid Recharge (account-fund-sub) Number*: 8-____-____-____-____-____-____

*The cost of the medical evaluation (if needed) and any respiratory protection equipment issued will be charged to the account-fund-sub number listed above.

Annual Respirator Health Status Questionnaire

Please answer the following questions to determine if a follow-up medical evaluation is needed:

Have there been any changes in your work activity, activity level and work practices within the past year as it relates to your respirator use? ______________________________________________________

Have there been any changes in the health hazards for which the respirator was originally issued? __________________________________________________________________________

Have there been any changes in your health that may affect your ability to wear a respirator? __________________________________________________________________________________________

Have you experienced any health symptoms, medical issues or discomfort while using your respirator over the past year? __________________________________________________________________________________________

If you answered “yes” to any of the above questions a follow-up medical evaluation is required. Please contact EH&S using the information below for instructions.

Annual Refresher Training

Annual refresher training is required by the Cal/OSHA Respiratory Protection Standard. Respirator users shall at a minimum demonstrate knowledge of the following to ensure safe and proper use of their respiratory protection:

- Why it is necessary, and how facial hair, or improper fit, usage, or maintenance can compromise the protective effect of their respirator(s);
- The limitations and capabilities of their respirator(s);
- How to use their respirator(s) effectively in emergency situations, including situations in which the respirator malfunctions;
- How to inspect, don, doff, use, and check the seals of their respirator(s);
- What the procedures are for maintenance and storage of their respirator(s);
- Usage log requirements and cartridge change schedules for their respirator(s);
- How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators; and
- The general requirements of the Respiratory Protection Standard.

I certify that I’ve been trained and have a sufficient knowledge of the items listed above.

Employee’s Signature: _____________________________ Date: ______________
Instructor’s Signature: _____________________________ Date: ______________
Attachment F

Filtering Facepiece Respirator Voluntary Use Form

Prior to use, all individuals not enrolled in the UCSB Respiratory Protection Program who will use filtering facepiece respirators (dust masks) on a voluntary basis must read and sign this form. Please forward completed forms to EH&S using the information at the bottom of the page.

Section 5144 Appendix D: (Mandatory) Information for Employees Using Respirators When Not Required Under the Standard

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

All employees must:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
2. Use respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
3. Not wear respirators into unknown atmospheres, or atmospheres containing contaminants for which your respirator is not designated to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors or very small solid particles of fumes or smoke.
4. Keep track of their respirator so that they do not mistakenly use someone else's respirator.

At UCSB the voluntary use of filtering facepiece respirators (FFRs) must first be approved by EH&S and is only allowed under the following conditions:

1. Safety Data Sheets for all materials (if applicable) have been reviewed and a Job Hazard Analysis has been performed.
2. FFRs are NIOSH-approved and are used only for nuisance level contaminants under their applicable exposure limits.
3. FFRs shall not be used in oxygen-deficient atmospheres or atmospheres containing contaminants above their Permissible Exposure Limit (PEL).
4. FFRs are disposed of after each use.

If you have any questions regarding the proper usage of FFRs, please contact the EH&S Industrial Hygiene Division using the information below.
By signing below, I acknowledge that I have read and understand the material that was presented in Appendix D to California Code of Regulations, Title 8, Section 5144.

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</tbody>
</table>
Attachment G

UCSB Job Hazard Assessment & Personal Protective Equipment Selection and Training Tool

Evaluation

<table>
<thead>
<tr>
<th>NAME OF INDIVIDUAL PERFORMING EVALUATION:</th>
<th>DATE OF EVALUATION</th>
</tr>
</thead>
</table>

EVALUATION FOR (Individual, Job, Process):

CERTIFICATION. By signing this form the individual certifies that a workplace hazard assessment has been performed in accordance with 8 CCR § 3380.

SIGNATURE

Job Hazard Assessment

Instructions: 1) Use this form to perform a documented job hazard assessment for each job task that necessitates the use of personal protective equipment (PPE), 2) Provide training and document on the (attached) training roster, and 3) Maintain this documentation until the task is no longer being performed. Example of hazards include: Impact, penetration, compression, laceration, exposure, heat, noise and light (optical) radiation. Note that these Personal Protective Equipment (PPE) controls should be used in conjunction with other controls (engineering, administrative, and work practices).

<table>
<thead>
<tr>
<th>Task</th>
<th>Hazard</th>
<th>Control</th>
<th>PPE required</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>
# PPE Training Roster

<table>
<thead>
<tr>
<th>Class:</th>
<th>Personal Protective Equipment (PPE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date/Time:</td>
<td>____________________________________________</td>
</tr>
<tr>
<td>Location:</td>
<td>____________________________________________</td>
</tr>
<tr>
<td>Instructor:</td>
<td>__________________________</td>
</tr>
</tbody>
</table>

**Topics:**
- When PPE is necessary;
- What PPE is necessary;
- How to properly don, doff, adjust, and wear PPE;
- Limitations of PPE;
- Proper care, maintenance, useful life, and disposal of PPE;
- Demonstration of ability to use PPE. [8 CCR 3380]

**Instructions:**
1. Complete this form for **each** personnel member.
2. Submit this form to EH&S Training by campus mail, fax (805) 893-8659 or email nick.nieberding@ehs.ucsb.edu.

<table>
<thead>
<tr>
<th>Name</th>
<th>Identification Number*</th>
<th>Date Trained</th>
<th>Student Signature**</th>
<th>Instructor Initial***</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
</tr>
</tbody>
</table>

*Identification: Enter your Student ID, Employee ID, UC NetID, UC Email, or Date of Birth.
**Student Signature: By signing this document I acknowledge that I received and understood the training above.
***Instructor Initial: By my initials I certify that the individuals on this roster have successfully passed the course (assessment).
## UCSB Job Hazard Assessment & Personal Protective Equipment Selection and Training Tool (sample)

### Evaluation

<table>
<thead>
<tr>
<th>NAME OF INDIVIDUAL PERFORMING EVALUATION</th>
<th>DATE OF EVALUATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joe Supervisor</td>
<td>05/06/2011</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EVALUATION OF (Individual, Job, Process)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Research Assistant</td>
</tr>
</tbody>
</table>

**CERTIFICATION.** By signing this form the individual certifies that a workplace job hazard assessment has been performed in accordance with 8 CCR § 3380.

**SIGNATURE**

Joe Supervisor

---

### Job Hazard Assessment

**Instructions:**

1. Use this form to perform a documented job hazard assessment for each job task that necessitates the use of personal protective equipment (PPE).
2. Provide training and document on the (attached) training roster.
3. Maintain this documentation until the task is no longer being performed.

Example of hazards include: Impact, penetration, compression, laceration, exposure, heat, noise and light (optical) radiation. Note that these Personal Protective Equipment (PPE) controls should be used in conjunction with other controls (engineering, administrative, and work practices).

<table>
<thead>
<tr>
<th>Task</th>
<th>Hazard</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research using organolithium compounds</td>
<td>Chemical (flammability and corrosivity)</td>
<td>☑️ Eye / Face: Safety glasses and face shield</td>
</tr>
<tr>
<td></td>
<td></td>
<td>☑️ Body: Flame-resistant laboratory coat or coveralls</td>
</tr>
<tr>
<td></td>
<td></td>
<td>☑️ Hand: Nitrile gloves</td>
</tr>
<tr>
<td></td>
<td></td>
<td>☑️ Foot: Closed-toe shoes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>☑️ Other:</td>
</tr>
<tr>
<td>Operation of Class 3B laser</td>
<td>Heat and Light (optical) radiation (Burns to eyes and/or skin)</td>
<td>☑️ Eye / Face: Laser safety glasses/goggles with OD 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>☑️ Body: Long-sleeved shirts and pants made of natural fibers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>☑️ Other: Hearing protection</td>
</tr>
<tr>
<td>Disposal of biohazardous waste</td>
<td>Chemical (bloodborne pathogens)</td>
<td>☑️ Eye / Face: Safety glasses</td>
</tr>
<tr>
<td></td>
<td></td>
<td>☑️ Body: Laboratory coat</td>
</tr>
<tr>
<td></td>
<td></td>
<td>☑️ Hand: Gloves</td>
</tr>
<tr>
<td></td>
<td></td>
<td>☑️ Foot: Closed-toe shoes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>☑️ Other:</td>
</tr>
</tbody>
</table>

---

30
Attachment H

UCSB Cartridge Change Schedule

Introduction

UCSB Environmental Health & Safety has developed the Cartridge Change Schedule Chart for the university respirator users, using the methods listed below.

Methods Used to Develop Cartridge Change Schedules

1. Exposure Assessments
   The use of quantitative and qualitative exposure assessments to estimate contaminant concentrations.

2. Respirator and Cartridge Manufacturer Recommendations
   Respirator and cartridge manufacturer’s tools, data and expertise are used to help calculate cartridge change schedules when applicable. Service Life Indicators (ESLI) are also used when available.

3. Literature Review and Professional Judgment
   When manufacturer tools and/or data is not available, EHS will use the following information to calculate cartridge change schedules: The type, quantity, concentration, toxicity, physical characteristics (state, boiling point, vapor pressure) and other relevant information from SDSs and other literature for hazardous substances used, breathing rate, working conditions (indoor/outdoor), evaluation of controls, temperature, relative humidity and additional safety factors.

4. Rule of Thumb
   Available rules of thumb: driven or resulted from experimental work by scientific organizations (AIHA, NIOSH). One such “Rule of Thumb” for estimating organic vapor cartridge service life is found in Chapter 36 of the AIHA publication “The Occupational Environment – Its Evaluation and Control.” It suggests that:
   • The chemical’s boiling point is > 70º C and the concentration is less than 200 ppm you can expect a service life of 8 hours at a normal work rate.
   • Service life is inversely proportional to work-rate (breathing rate). Most cartridge studies have used the high end of moderate work-rate of 50-60 liters per minutes.
   • Reducing concentration by a factor of 10 will increase service life by a factor of 5.
   • Humidity above 85% will reduce service life by 50%.
   • The higher the temperature the lower the service life. Temperature effects alone have been reported to reduce the service life 1-10% for every 10 degrees Celsius rise depending on the specific solvent (Nelson, et. Al., 1976).
Respirator Cartridge Change Schedule for UCSB Respirator Users
Based on the above four principals the following cartridge change schedule is recommended (*Note: If users think they are experiencing contaminant breakthrough (where air contaminants are not being filtered properly) prior to this time they should stop using respirator immediately and contact EH&S):

<table>
<thead>
<tr>
<th>Respirator Users (By Department or Hazard Class)</th>
<th>Cartridge Type(s)</th>
<th>Respiratory Hazards</th>
<th>Cartridge Change Schedule*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal Resource Center</td>
<td>P100, N95</td>
<td>Animal dander</td>
<td>After 40 hours of use*</td>
</tr>
<tr>
<td>Animal Resource Center</td>
<td>Multi-Gas</td>
<td>Hydrogen Peroxide</td>
<td>After 8 hours of use*</td>
</tr>
<tr>
<td>Biology Greenhouse Facility</td>
<td>OV/AG/P100</td>
<td>Captan Fungicide</td>
<td>After 16 hours of use*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Orthene</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Horticulture Oils</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pesticides</td>
<td></td>
</tr>
<tr>
<td>Earth Science Woodhouse Lab</td>
<td>AG</td>
<td>Hydrochloric,</td>
<td>After 2 hours of use*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>hydrofluoric, and</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>nitric acids</td>
<td></td>
</tr>
<tr>
<td>EH&amp;S – Community Hazardous Waste</td>
<td>OV/AG/P100</td>
<td>Organic Solvents</td>
<td>Bulking paints/solvents:</td>
</tr>
<tr>
<td></td>
<td>ammonia, methylamine, formaldehyde and hydrogen fluoride</td>
<td>Acids</td>
<td>After 8 hours of use*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oil &amp; water-based</td>
<td>Collection/Segregation/Over-packing:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Paints</td>
<td>After 40 hours of use*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pesticides</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Asbestos</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Waste Engine Oil</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Engine coolants</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consumer products</td>
<td></td>
</tr>
<tr>
<td>EH&amp;S – Campus Hazardous Waste</td>
<td>OV/AG/P100</td>
<td>Organic Solvents</td>
<td>Bulking: After 8 hours of use*</td>
</tr>
<tr>
<td></td>
<td>ammonia, methylamine, formaldehyde and hydrogen fluoride</td>
<td>Acids</td>
<td>Collection/Segregation/Over-packing: After 40 hours of use*</td>
</tr>
<tr>
<td></td>
<td>Mercury (Hg)</td>
<td>Mercury</td>
<td></td>
</tr>
<tr>
<td>EH&amp;S – Emergency Response</td>
<td>OV/AG/P100</td>
<td>Organic Chemicals,</td>
<td>The cartridges will be changed Once the ESLI turns brown*</td>
</tr>
<tr>
<td></td>
<td>ammonia, methylamine, formaldehyde and hydrogen fluoride</td>
<td>Acids, Heavy metals, Asbestos</td>
<td>ESLI: End of Service Life Indicator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Potential short-term response (1-2 hours) to an emergency</td>
<td></td>
</tr>
<tr>
<td>Facilities &amp; Housing Trades</td>
<td>OV/P100</td>
<td>Consumer Products,</td>
<td>After 16 hours of use*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lubricants</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Solvents</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Glues</td>
<td></td>
</tr>
<tr>
<td>Respirator Users (By Department or Hazard Class)</td>
<td>Cartridge Type(s)</td>
<td>Respiratory Hazards</td>
<td>Cartridge Change Schedule*</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>------------------</td>
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<td>---------------------------</td>
</tr>
</tbody>
</table>
| Facilities & Housing Painters                   | OV - P100        | Oil/latex/water-based paints  
Old Lead paints  
Acetone  
Paint thinner | **Oil-based paints & Solvents:**  
After 8 hours of use*  
**Lead Paint scraping:**  
After 8 hours of use*  
**Latex/Water-based Paints:**  
After 40 hours of use* |
| Facilities & Housing Grounds                    | OV - P100        | Roundup Pro          | After 40 hours of use*     |
| Facilities/HRS - Water Engineers                | OV/AG/P100       | Hydrochloric Acid  
Sodium - Hypochlorite  
Chlorine Tablets | After 40 hours of use*     |
| Filtering Facepiece Respirators                 | All types (N,P, R 95/99/100) | Nuisance dusts and other particulates | After each use* |
| Geology Rock Crushing Shop                      | P100             | Dust and silica from rock samples | After 40 hours of use*     |
| Materials - MBE                                 | OV/AG/P100       | Isopropanol  
Acetone  
Arsenic  
Phosphorous  
Gallium  
Aluminum  
Iron  
Silicon  
Manganese  
Indium  
Antimony  
Beryllium | Cartridges will be changed after each shutdown or service to equipment.  
No more than 40 hours of use for each cartridge* |
| Materials ECE                                   | Multi-Gas Vapor/P100 | Heavy metals, acids, chorine, ammonia, boron trichloride, silicon tetrachloride | After 16 hours of use*  |
| Student Health Services                         | N95              | Influenza virus       | After each use*           |
| Transportation Services                         | OV/P100          | Consumer Products  
Lubricants  
Solvents  
Carburetor/Brake Cleaners | After 16 hours of use*  |
| Welding/soldering fumes                         | P100             | Welding Fumes        | After 40 hours of use*    |

*Note: If users think they are experiencing contaminant breakthrough (where air contaminants are not being properly filtered) prior to this time they should stop using respirator immediately and contact EH&S.
## Respirator/Cartridge Usage Log
*(To be filled out by Respirator Users)*

<table>
<thead>
<tr>
<th>Name</th>
<th>Type of Respirator</th>
<th>Cartridge Type</th>
<th>EH&amp;S Recommended Cartridge Change-out*</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Cartridge Condition (New or Used)</th>
<th>Start Time</th>
<th>End Time</th>
<th>Activity</th>
<th>Name/Type of Hazardous Material (e.g. acetone, oil-based paint, asbestos)</th>
<th>Duration of Use (Round up to next half hour increment)</th>
<th>Total Hours Cartridge Used**</th>
<th>Comments</th>
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</tbody>
</table>

* If you think you are experiencing contaminant breakthrough prior to this time stop using respirator immediately and contact EH&S.

**If this number is greater or equal to the EH&S recommended cartridge change-out, properly dispose of cartridges and replace with a new pair.
### UCSB Respirators and Cartridge Weight Chart

<table>
<thead>
<tr>
<th>TYPE</th>
<th>SIZE</th>
<th>WEIGHT (oz)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MSA RESPIRATORS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comfo Elite</td>
<td>Small</td>
<td>6.5</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>6.5</td>
</tr>
<tr>
<td></td>
<td>Large</td>
<td>7.5</td>
</tr>
<tr>
<td>Comfo Classic</td>
<td>Small</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>6.4</td>
</tr>
<tr>
<td></td>
<td>Large</td>
<td>6.5</td>
</tr>
<tr>
<td>Ultra -Twin</td>
<td>Small</td>
<td>20.5</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>21.1</td>
</tr>
<tr>
<td></td>
<td>Large</td>
<td>21.0</td>
</tr>
<tr>
<td><strong>3M RESPIRATORS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6100</td>
<td>Small</td>
<td>2.8</td>
</tr>
<tr>
<td>6200</td>
<td>Medium</td>
<td>2.9</td>
</tr>
<tr>
<td>6300</td>
<td>Large</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>SCOTT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2 Face</td>
<td>Small</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>Large</td>
<td>6.0</td>
</tr>
<tr>
<td>Full Face</td>
<td>Small</td>
<td>19.0</td>
</tr>
<tr>
<td></td>
<td>Large</td>
<td>19.0</td>
</tr>
<tr>
<td></td>
<td>X-Large</td>
<td>19.0</td>
</tr>
</tbody>
</table>

**WEIGHT OF ONE PAIR OF CARTRIDGES (2)**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>WEIGHT (oz)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MSA CARTRIDGES</strong></td>
<td></td>
</tr>
<tr>
<td>P100</td>
<td>2.7</td>
</tr>
<tr>
<td>GMC-P100</td>
<td>7.5, 7.8</td>
</tr>
<tr>
<td>GME-P100</td>
<td>9.0, 9.5</td>
</tr>
<tr>
<td><strong>3M CARTRIDGES</strong></td>
<td></td>
</tr>
<tr>
<td>6000 Org Vap</td>
<td>6.0</td>
</tr>
<tr>
<td>60923 OV. AG, P100</td>
<td>8.0</td>
</tr>
<tr>
<td>P100 filters</td>
<td>0.6</td>
</tr>
<tr>
<td>N95 +retainer</td>
<td>1.0</td>
</tr>
</tbody>
</table>
SCOTT

P-100 3.5
OA 8.0
OV 7.0
OV-H 10.5
OA-P100 10.5

WEIGHT OF ASSEMBLED RESPIRATOR AND PAIR OF CARTRIDGES

<table>
<thead>
<tr>
<th>RESPIRATOR PLUS</th>
<th>CARTRIDGE TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MSA</td>
</tr>
<tr>
<td></td>
<td>P100</td>
</tr>
<tr>
<td></td>
<td>GMCP100</td>
</tr>
<tr>
<td></td>
<td>GME-P100</td>
</tr>
<tr>
<td></td>
<td>COMBO</td>
</tr>
<tr>
<td></td>
<td>COMBO-PLUS</td>
</tr>
<tr>
<td>Comfo Elite</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>9.0</td>
</tr>
<tr>
<td></td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td>16.0</td>
</tr>
<tr>
<td>M</td>
<td>9.0</td>
</tr>
<tr>
<td></td>
<td>14.5</td>
</tr>
<tr>
<td></td>
<td>16.0</td>
</tr>
<tr>
<td>L</td>
<td>10.0</td>
</tr>
<tr>
<td></td>
<td>15.3</td>
</tr>
<tr>
<td></td>
<td>16.8</td>
</tr>
<tr>
<td>Comfo-Classic</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>8.5</td>
</tr>
<tr>
<td></td>
<td>13.7</td>
</tr>
<tr>
<td></td>
<td>15.5</td>
</tr>
<tr>
<td>M</td>
<td>9.0</td>
</tr>
<tr>
<td></td>
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